1st Edition–2024

Pandrol
Training
Academy


# Training & Services Catalogue 2024

PANDROL

Dedicated to your success

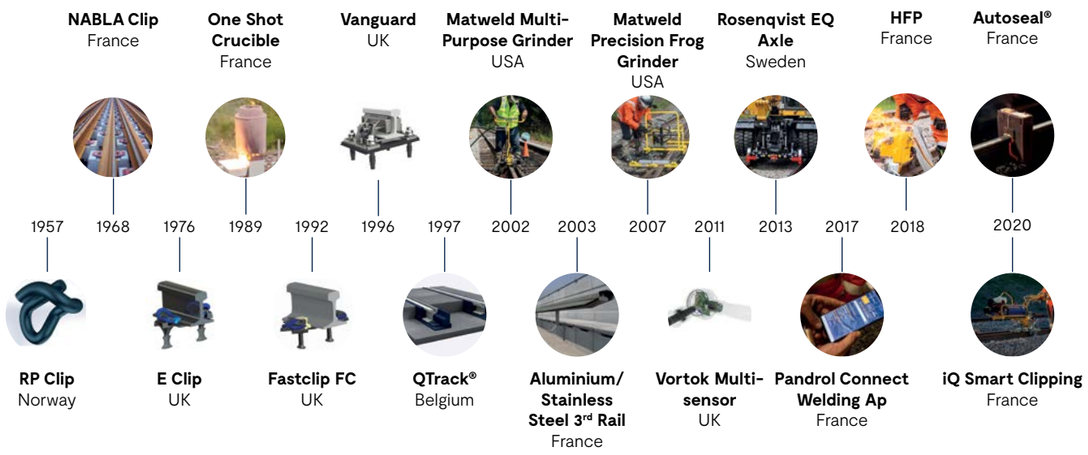
# Partners in Excellence

Pandrol sets industry standards for rail fastening and aluminothermic welding systems. We have created railway infrastructure in more than 100 countries with our products and services ranging from equipment design, development and manufacture to increase the efficiency of railway construction and maintenance. This means that we have experienced just about every situation and challenge.

# Our History

Part of the Delachaux Group, Pandrol is a company built on a passion for innovation, and our unique heritage is still at the heart of our craftsmanship today. More than 100 years of product development, engineering expertise, acquisitions and growth have allowed us to become a world leader and a global player with more than 1700 employees over 40 sites.

In 2017 all the activities of the rail division of the Delachaux Group were brought together under the single brand of Pandrol, including Railtech, specialists in welding equipment and electrification solutions; Vortok, specialists in railway equipment; CDM Track; Rosenqvist Rail; Matweld; RSS and Pandrol, fastening system solutions company.




# A complete service

We are technicians, engineers, developers and designers who solve complex customer problems using our unique history of innovation and a never-ending search for new ideas. We support our customers at every stage of the process, from design and installation to operation, monitoring and maintenance.




## 1 / Presentation of the PTA center



## 2 / Training Modules



## 3 / Expertise



## 4 / Useful Information

# Overview of the Training Center

The experience and know-how of the Pandrol Training Academy Training Center comes from more than 30 years of dedication to aluminothermic rail welding and 30 years of sharing and exchanging with our customers and partners

Our Training Engineering is designed by a professional team known and recognized throughout the world with cross-disciplinary skills in applied pedagogy, metallurgy, research and aluminothermic welding.

Training is provided by experienced instructors. All our instructors are accredited by Pandrol SAS with international diplomas according to standard 14730-2 and certified by SNCF

Technical assistance and advice is provided by our team of instructors, technicians, site managers, engineers and experts in metallurgy

## Your Contacts

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## Our Quality Approach

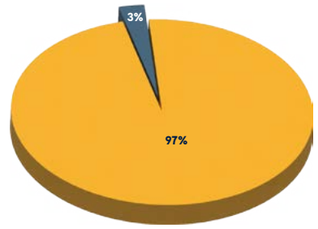
All our training courses are certified. Our Qualiopi quality, environment & safety indicators meet ISO9001 – ISO14001 – ISO45001 standards

### Detailed results of our training courses–2023

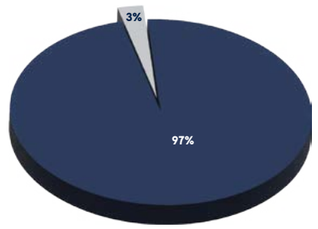
Our ISO-certified quality approach means that we measure the satisfaction of our customers every year in order to measure satisfaction rates of our services.

We would like to thank our customers for taking the time to complete this survey. Thanks to you, we are continually improving our service

**Success rate**

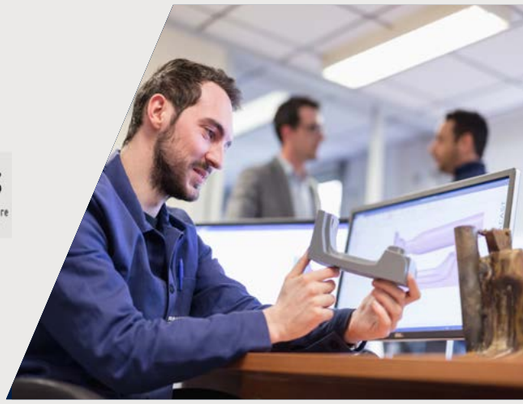



**Level of satisfaction**




## Pandrol Training Academy Courses

can be financed by the majority of OPCOs, OPACIFs, and many other collecting bodies...



# Our Strength

PANDROL

Our training center is a member of

Railway Industries Association

SETVF: Track Works Contractors' Union

Training and technical assistance partners

**Product Line**

Expert technical service for aluminothermic welding

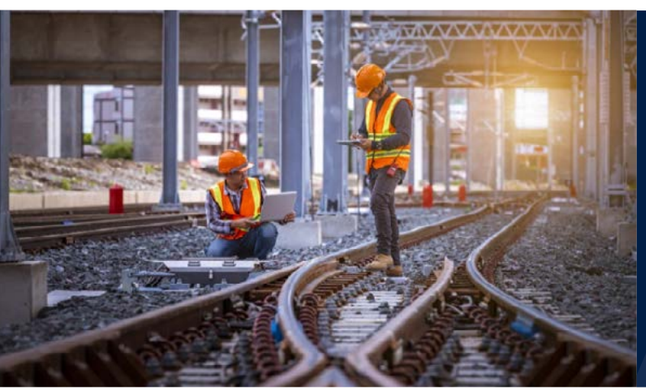
**Laboratory**

Aluminothermic welding expertise service

**Railweld**

Expert company in the implementation of aluminothermic welding

Inspection partners



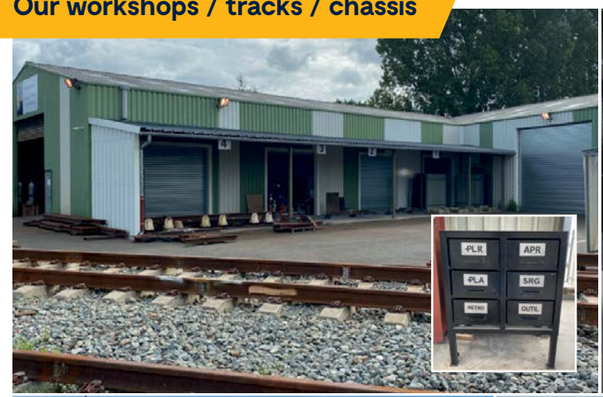
Pandrol Training Academy's training center builds close relationships with its customers and has forged numerous industry partnerships through its comprehensive and global offer.

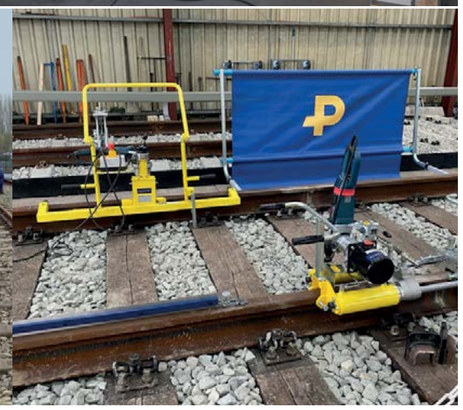
## Our Facilities

We have dedicated training spaces and digital training tools available for the theoretical training. Facilities also include an enclosed space with 4 welding frames, as well as an open air track, allow a setting close to that of an in-situ site.

A fleet of Pandrol machines makes it possible to discover the different types of equipment necessary for carrying out aluminothermic welding and track maintenance.

### Our workshops / tracks / chassis



### Our training rooms


# Our Services

## Discover all of our topics

We offer training for all welding processes, either to acquire or perfect the necessary skills for welders, with the possibility of preparing or renewing qualifications according to the different processes.

- Aluminothermic welding training
- Inspector training: geometry & defectology of aluminothermic welds
- Upgrade on demand
- University assistance for business presentation to IUT Civil Engineering students in the Railway specialization
- Tailored training according to specific construction site context
- Distance learning
- On-site technical support

People with disabilities or reduced mobility cannot take this training course given the safety context of railway work, which requires the full possession of physical capabilities.

## Our Tools



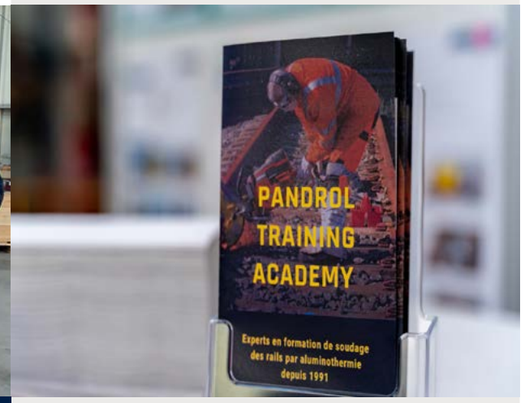
An active learning method that makes the difference

- E-Learning
- Tutorials
- Chain






# Our Customers




Meeting our customers' needs is at the heart of what we do.

For us, each client is unique, we will always work in partnership with our customers to meet their individual requirements and give them the certainty of having made the best choice. This partnership means above all supporting, listening to, anticipating clients' requests throughout their educational journey

We are proud of our customers, and especially of their success


Our experts will lead you step by step, helping to choose the ideal solution with custom study paths.

## 2 / Training Modules

1

# PLR Process

The PLR process was developed by Pandrol for aluminothermic welding of Vignole rails. It offers a high-performance, safe and simple solution. As an industry standard in France, it has been used for more than 20 years on the entire French national network, as well as internationally.

All TGV lines in France have been welded using the PLR process. The world speed record on LGV (574.8 km/h) was recorded on a track welded with the PLR process.





## Module 1-PLR

### Audience
- This course is mainly intended for assistant welders, welders, metalworkers, and boilermakers who wish to learn, improve or specialize in aluminothermic welding.

### Prerequisites
- Be an employee of an aluminothermic rail welding company.
- B1 level in French oral and written, or equivalent.

### Required Qualifications
- Good hand and movement skills. Satisfactory visual acuity is a determining factor for success in this training

### Main Goals
- Apply the basic safety rules related to aluminothermic welding.
- Choose consumables and equipment adequate to the context of the site.
- Carry out the welding of the rails on the track according to the operating mode and the SNCF prescriptions.
- Check the conformity of the work performed.

### Teaching Methods
- Objective based teaching
- Theory in the classroom (video/tutorial techniques)
- Practical demonstration in the workshop and on the track
- Technical documents given to each participant
- Concrete case studies
- Questions/Answers along with exchanges with the students

### Assessment and validation of acquired knowledge
- Theoretical MCQ
- Practical examination
- Summary of achievements at the end of each day
- End of training diploma

## Course Contents

### Metallurgical Principles
- State the metallurgical principles of rails
- State the principles of aluminothermic welding
- Recall the metallurgical nuances of rails
- Adequacy of aluminothermic charge/rails

### Worksite Safety
- Choosing the right personal protective equipment
- Understanding inherent risks in the business
- Identifying railway risks

### Welding Methods
- Rail profile and grade identification
- Preparation of rail ends before welding
- Performing rail welding
- Completion of the weld

| Delivery | |
|---|---|
| Duration | 15 days (105 hours) Initial |
| Date and deadline | At your request and according to our schedule |
| Place | Raismes, France |
| Price | Please contact us |

### Wide gap weld (55-68)
- Specific technical requirements
- Penetration testing
- Case studies/feasibility/possibilities

### Track merge welding
- Determine the position of the weld
- Reminder of specific measures
- Welding of switch rails and stock rails
- Geometric tolerance (MT00027)

### Maintenance welding
- Machining of molds
- Supplier warranty

### Welding traceability
- Weld marking (punch number)
- Issuance of the daily report

2

# PLA Process

Pandrol's PLA process is one of the most advanced aluminothermic welding approaches in the world.

It has been optimized on all technical aspects to minimize welding time, while always guaranteeing excellent results.





## Module 2-PLA

### Audience
- This course is mainly intended for welders already trained in the PLR process

### Prerequisites
- Be an employee of an aluminothermic rail welding company.
- B1 level in French oral and written, or equivalent.
- At least 6 months of field training prior to the course.

### Required Qualifications
- Good hand and movement skills. Satisfactory visual acuity is a determining factor for success in this training.

### Teaching Methods
- Objective based teaching
- Theory in the classroom (video/tutorial techniques)
- Practical demonstration in the workshop and on the track
- Technical documents given to each participant
- Concrete case studies
- Questions/Answers along with exchanges with the students

### Assessment and validation of acquired knowledge
- Theoretical MCQ
- Practical examination
- End of training diploma

## Course Contents

### Quality of the PLA Process
- Review of rail metallurgy
- Review of the principles and advantages of aluminothermic welding
- **Review** of the different PLA preheating modes

### Worksite Safety
- Choosing the right personal protective equipment
- Understanding inherent risks in the business
- Identifying railway risks (tunnel)

### Welding Methods
- Rail profile and grade identification
- Preparation of rail ends before welding
- Performing rail welding
- Weld hammering and inspection parameters according to the technical instructions
- Completion of the weld ·

### Wide gap weld (68)
- Specific technical requirements
- Explanation of mold differences
- Penetration testing
- Inspection criteria

### Track merge welding
- Determine the position of the weld
- Reminder of specific measures
- Geometric criteria according to standard 14730-2
- Geometric tolerances depending on the network (SNCF, RATP etc.)

### Maintenance welding
- Machining of molds
- Supplier warranty

### Welding traceability
- Weld marking (punch number)
- Issuance of the daily report

| Delivery | |
|---|---|
| Duration | 5 days (35 hours) Extension<br>10 days (70 hours) Initial |
| Date and deadline | At your request and according to our schedule |
| Place | Raismes |
| Price | Please contact us |

3


# PLHP 29 Process

Pandrol's PLHP 29 process was developed to improve the longevity of traditional aluminothermic welds.

With a specific 29 mm gap and optimized preheating, it meets the technical constraints of the most stressed networks.

Developed in the Parisian metropolis, this process has now found its way into the most complex networks.





## Module 3–PLHP 29

**Audience**
- This course is mainly intended for welders already experienced in the PLR or PLA process

**Prerequisites**
- Be an employee of an aluminothermic rail welding company.
- B1 level in French oral and written, or equivalent.

**Required Qualifications**
- At least 6 months of field training prior to the course.
- Good hand and movement skills. Satisfactory visual acuity is a determining factor for success in this training.

**Teaching Methods**
- Theory in the classroom
- Practical demonstrations in the workshop and on the track
- Technical documents given to each participant
- Concrete case studies

**Assessment and validation of acquired knowledge**
- Theoretical MCQ
- Practical examination
- End of training diploma

## Course Contents

**Metallurgical Principles**
- State the history of the PLHP 29 process
- State the application areas of PLHP 29
- Metallurgical nuances of rails
- Adequacy of aluminothermic charge/rails

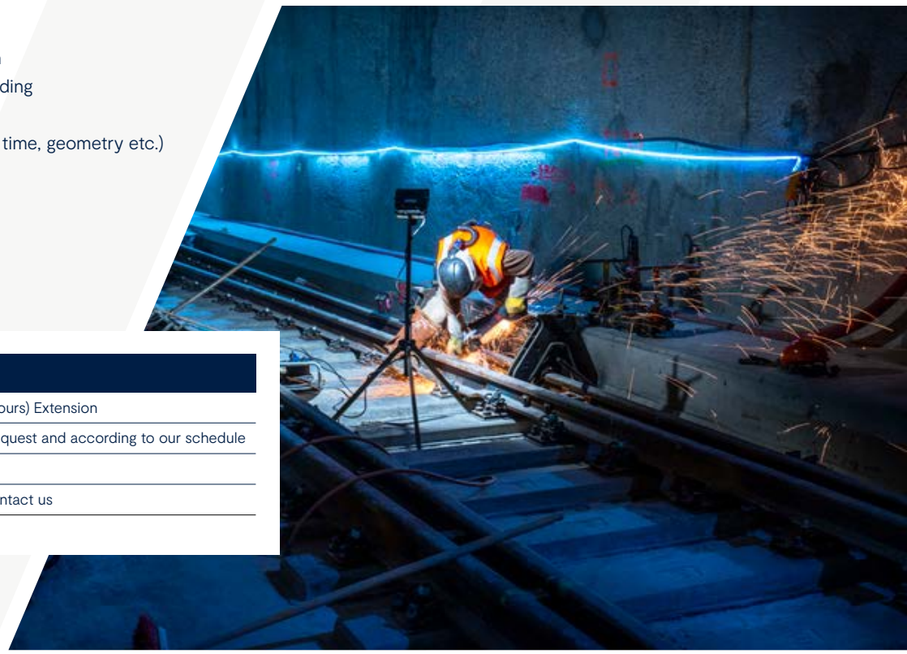
**Worksite Safety**
- Choosing the right personal protective equipment
- Understanding inherent risks in the business
- Identifying railway risks

**Welding Methods**
- Rail profile and grade identification
- Preparation of rail ends before welding
- Performing PLHP 29 rail welding
- Specifics of PLHP 29 (adjustment, time, geometry etc.)
- Completion of the weld

**Maintenance welding**
- Machining of molds
- Supplier warranty

**Welding traceability**
- Weld marking (punch number)
- Issuance of the daily report

| Delivery | |
|---|---|
| Duration | 1 day (8 hours) Extension |
| Date and deadline | At your request and according to our schedule |
| Place | Raismes |
| Price | Please contact us |



4

# HWR CC JS Process

The Head Wash Repair (HWR) welding process was developed by Pandrol to meet the demands of networks when repairing defects located in the rail head.

This technology allows significant savings on maintenance work by avoiding the installation of a new rail section or manual repair by arc welding. The intervention time is reduced and the quality of the repair is guaranteed.





## Module 4–HWR CC JS

### Audience
- This course is intended for welders holding a PLR diploma wishing to perfect their skills in repairing rails using the HWR process

### Prerequisites
- Be an employee of an aluminothermic rail welding company.
- B1 level in French oral and written, or equivalent.

### Required Qualifications
- Good hand and movement skills. Satisfactory visual acuity is a determining factor for success in this training.

### Main Goals
- Know the technical rules of the HWR process
- Carry out penetration testing and checks before welding
- Apply all the prescriptions of the Pandrol HWR technical manual
- Perform an entire HWR rail repair
- Check the conformity of the work performed

### Teaching Methods
- Theory in the classroom (video/tutorial techniques)
- Practical demonstration in the workshop and on the track
- Oriented works on the track
- Technical documents given to each participant
- Case studies/feasibility
- Questions/Answers along with exchanges with the students

### Assessment and validation of acquired knowledge
- Theoretical MCQ
- Practical examination
- End of training diploma

## Course Contents

### Knowledge of the materials
- State the history of the HWR process
- Identify preheating materials

### Worksite Safety
- Choosing the right personal protective equipment
- Understanding inherent occupational risks
- Identifying railway risks

### Welding Methods
- Welding adjustments and contraindications
- Performing the notch (flame cutting)
- Inspection for the absence of residual defects (penetration testing)
- Machining of molds according to the profile
- Mold luting
- Post-casting procedures
- Finish grinding and geometric requirements

### Maintenance welding
- Machining of molds
- Supplier warranty

### Welding traceability
- Weld marking (punch number)
- Issuance of the daily report

| Delivery | |
|---|---|
| Duration | 5 days (35 hours) Extension |
| Date and deadline | At your request and according to our schedule |
| Place | Raismes |
| Price | Please contact us |

# 5


## SRG-SRGN Process

Pandrol's SRG process for grooved rails has been optimized to provide a consistently excellent weld.

An advanced version is also available, the SRGN process. Thanks to the unique use of propane, the preheating of rail ends is simplified. The properties of the weld are improved and the geometry of the flat bosses of the weld facilitates the laying of the encapsulating foams which improve the insulation of the track.





## Module 5-SRG-SRGN

### Audience
- This course is intended for assistant welders already working, and welders qualified in other processes who wish to specialize in welding of grooved rails by aluminothermy.

### Prerequisites
- Be an employee of an aluminothermic rail welding company.

### Required Qualifications
- Good hand and movement skills. Satisfactory visual acuity is a determining factor for success in this training

### Main Goals
- Apply the basic safety rules related to the welding of grooved rails
- Choose consumables and equipment adequate to the context of the site
- Carry out the welding of grooved rails according to the different track contexts
- Check the conformity of the work performed

### Teaching Methods
- Objective based teaching
- Theory in the classroom (video/tutorial techniques)
- Practical demonstration in the workshop and on the track/chassis
- Technical documents given to each participant
- Questions/Answers along with exchanges with the students

### Assessment and validation of acquired knowledge
- Theoretical MCQ
- Practical examination
- End of training diploma

## Course Contents

### Identification of grooved rails
- Details on European standard 13674-2
- Difference between SRG/SRG-N
- Identify embossed track markings
- Pandrol Technical Manual

### Worksite Safety
- Choosing the right personal protective equipment
- Understanding inherent occupational risks
- Identifying railway risks

### Welding Methods
- Using the right welding kits
- Preparation of rail ends before welding
- Easel/corner adjustment
- Choosing your preheating mode
- Performing rail welding
- Completion of the weld

### Wide gap weld (68)
- Specific technical requirements
- Penetration testing
- Inspection criteria

### Maintenance welding
- Determine the position of the weld
- Reminder of specific measures
- Carry out a fitting weld

### Welding traceability
- Weld marking (punch number)
- Issuance of the daily report

| Delivery | |
|---|---|
| Duration | 5 days (35 hours) Extension |
| Date and deadline | At your request and according to our schedule |
| Place | Raismes |
| Price | Please contact us |

6

# APM Track Process

Pandrol has developed a comprehensive range of processes to weld most existing rail profiles and special rail grades, such as subway rails.

Our APM pack contains a crucible and a welding kit containing a charge and molds adapted to the profile and grade of the track to be welded.





## Module 6–APM Track

### Audience
- This course is intended for aluminothermic welders who wish to specialize in aluminothermic welding of subway rail profiles

### Prerequisites
- Be an employee of an aluminothermic rail welding company.
- B1 level in French oral and written, or equivalent.

### Required Qualifications
- Good hand and movement skills. Satisfactory visual acuity is a determining factor for success in this training.
- Ability to work in confined environments (tunnel)
- Ability to work nights and weekends

### Teaching Methods
- Objective based teaching
- Theory in the classroom (video/tutorial techniques)
- Practical demonstration in the workshop and on the track
- Technical documents given to each participant
- Concrete case studies/chassis
- Questions/Answers along with exchanges with the students

### Assessment and validation of acquired knowledge
- Theoretical MCQ
- Practical examination
- End of training diploma

## Course Contents

### Metallurgical Principles
- State the metallurgical principles of rails
- State the principles of aluminothermic welding
- Metallurgical nuances of rails
- Adequacy of aluminothermic charge/rails

### Worksite Safety
- Choosing the right personal protective equipment
- Understanding inherent occupational risks
- Identifying railway risks

### Welding Methods
- Using the right welding kits
- Preparation of rail ends before welding
- Easel/corner adjustment
- Choosing your preheating mode
- Performing rail welding
- Completion of the weld

### Welding traceability
- Weld marking (punch number)
- Issuance of the daily report

| Delivery | |
|---|---|
| Duration | 7 hours over 5 days of module 06 |
| Date and deadline | At your request and according to our schedule |
| Place | Raismes |
| Price | Please contact us |

6

# AP Track Process

Each Pandrol rail welding process has its own technical characteristics, designed to provide optimal results for specific track specifications.





## Module 6-AP Track

### Audience
- This course is intended for welders who wish to specialize in aluminothermic welding of subway rail profiles

### Prerequisites
- Be an employee of an aluminothermic rail welding company.
- Holder of at least oral and written B1 level in French or equivalent.

### Required Qualifications
- Good hand and movement skills. Satisfactory visual acuity is a determining factor for success in this training.
- Ability to work in confined environments (tunnel)

### Main Goals
- Apply the basic safety rules related to the aluminothermic welding.
- Choose consumables and equipment adequate to the context of the site.
- Carry out the welding of subway rails according to the operating mode and prescriptions of the network
- Check the conformity of the work performed.

### Teaching Methods
- Objective based teaching
- Theory in the classroom (video/tutorial techniques)
- Practical demonstration in the workshop and on the track
- Technical documents given to each participant
- Concrete case studies
- Questions/Answers along with exchanges with the students

### Assessment and validation of acquired knowledge
- Theoretical MCQ
- Practical examination
- End of training diploma

## Course Contents

### Metallurgical Principles
- State the metallurgical principles of rails
- State the principles of aluminothermic welding
- Metallurgical nuances of rails
- Adequacy of aluminothermic charge/rails

### Worksite Safety
- Choosing the right personal protective equipment
- Understanding inherent occupational risks
- Identifying railway risks

### Welding Methods
- Rail profile and grade identification
- Preparation of rail ends before welding
- Performing rail welding
- Completion of the weld

### Track merge welding
- Determine the position of the weld
- Reminder of specific measures
- Geometric tolerance

### Maintenance welding
- Machining of molds
- Supplier warranty

### Welding traceability
- Weld marking (punch number)
- Issuance of the daily report

| Delivery | |
|---|---|
| Duration | 7 hours over 5 days of module 06 |
| Date and deadline | At your request and according to our schedule |
| Place | Raismes |
| Price | Please contact us |

6

# PLI BG 44 Process

The PLI process for the BG 44 guide bar has been developed by Pandrol and is suitable for all environments or site configurations.





## Module 6-PLI BG 44 Track

### Audience
- This course is intended for aluminothermic welders who wish to specialize in the welding of subway-type rails

### Prerequisites
- Be an employee of an aluminothermic rail welding company.
- Holder of at least oral and written B1 level in French or equivalent.

### Required Qualifications
- Good hand and movement skills. Satisfactory visual acuity is a determining factor for success in this training.
- Ability to work in confined environments (tunnel)
- Ability to work nights and weekends

### Main Goals
- Apply the basic safety rules related to the welding of rails by aluminothermy.
- Choose consumables and equipment adequate to the context of the site.
- Carry out the welding of the rails on the track according to the operating mode and the SNCF prescriptions.

### Teaching Methods
- Objective based teaching
- Theory in the classroom (video/tutorial techniques)
- Practical demonstration in the workshop and on the track
- Technical documents given to each participant
- Concrete case studies
- Questions/Answers along with exchanges with the students

### Assessment and validation of acquired knowledge
- Theoretical MCQ
- Practical examination
- End of training diploma

## Course Contents

### Metallurgical Principles
- State the metallurgical principles of rails
- State the principles of aluminothermic welding
- Metallurgical nuances of rails
- Adequacy of aluminothermic charge/rails

### Worksite Safety
- Choosing the right personal protective equipment
- Understanding inherent occupational risks
- Identifying railway risks

### Welding Methods
- Rail profile and grade identification
- Preparation of rail ends before welding
- Use of tuning materials
- Performing rail welding
- Completion of the weld

### Track merge welding
- Determine the position of the weld
- Reminder of specific measures

### Maintenance welding
- Machining of molds
- Supplier warranty

### Welding traceability
- Weld marking (punch number)
- Issuance of the daily report

| Delivery | |
|---|---|
| Duration | 7 hours over 5 days of module 06 |
| Date and deadline | At your request and according to our schedule |
| Place | Raismes |
| Price | Please contact us |

6

# PLI HEB 140-160 Process

Pandrol provides leading aluminothermic welding solutions to customers around the world.

We also work with customers to design bespoke solutions for special rail types that are less commonly used.





## Module 6–PLI HEB 140-160 Track

### Audience
- This course is intended for aluminothermic welders who wish to specialize in the welding of subway-type rails

### Prerequisites
- Be an employee of an aluminothermic rail welding company.
- Holder of at least oral and written B1 level in French or equivalent.

### Required Qualifications
- Good hand and movement skills. Satisfactory visual acuity is a determining factor for success in this training.
- Ability to work in confined environments (tunnel)
- Ability to work nights and weekends

### Main Goals
- Apply the basic safety rules related to the welding of rails by aluminothermy.
- Choose consumables and equipment adequate to the context of the site.
- Carry out the welding of the rails on the track according to the operating mode and the SNCF prescriptions.

### Teaching Methods
- Objective based teaching
- Theory in the classroom (video/tutorial techniques)
- Practical demonstration in the workshop and on the track
- Technical documents given to each participant
- Concrete case studies
- Questions/Answers along with exchanges with the students

### Assessment and validation of acquired knowledge
- Theoretical MCQ
- Practical examination
- End of training diploma

## Course Contents

### Metallurgical Principles
- State the metallurgical principles of rails
- State the principles of aluminothermic welding
- Metallurgical nuances of rails
- Adequacy of aluminothermic charge/rails

### Worksite Safety
- Choosing the right personal protective equipment
- Understanding inherent occupational risks
- Identifying railway risks

### Welding Methods
- Rail profile and grade identification
- Preparation of rail ends before welding
- Performing rail welding
- Completion of the weld

### Track merge welding
- Determine the position of the weld
- Reminder of specific measures

### Maintenance welding
- Machining of molds
- Supplier warranty

### Welding traceability
- Weld marking (punch number)
- Issuance of the daily report

| Delivery | |
|---|---|
| Duration | 7 hours over 5 days of module 06 |
| Date and deadline | At your request and according to our schedule |
| Place | Raismes |
| Price | Please contact us |

6

# PLM T52 Process

The PLM T52 welding process is used for the electric current bar on certain subway lines.

Pandrol, based on its experience, has dedicated a specific application to it.





## Module 6-PLM T52 Track

### Audience
- This course is intended for aluminothermic welders who wish to specialize in the welding of subway-type rails

### Prerequisites
- Be an employee of an aluminothermic rail welding company.
- Holder of at least oral and written B1 level in French or equivalent.

### Required Qualifications
- Good hand and movement skills. Satisfactory visual acuity is a determining factor for success in this training
- Ability to work in confined environments (tunnel)

### Main Goals
- Apply the basic safety rules related to the welding of rails by aluminothermy.
- Choose consumables and equipment adequate to the context of the site.
- Carry out the welding of T52 current bar rails
- Check the conformity of the work performed.

### Teaching Methods
- Objective based teaching
- Theory in the classroom (video/tutorial techniques)
- Practical demonstration in the workshop and on the track
- Technical documents given to each participant
- Concrete case studies
- Questions/Answers along with exchanges with the students

### Assessment and validation of acquired knowledge
- Theoretical MCQ
- Practical examination
- End of training diploma

## Course Contents

### Metallurgical Principles
- State the metallurgical principles of rails
- State the principles of aluminothermic welding
- Metallurgical nuances of rails
- Adequacy of aluminothermic charge/rails

### Worksite Safety
- Choosing the right personal protective equipment
- Understanding inherent occupational risks
- Identifying railway risks

### Welding Methods
- Rail profile and grade identification
- Preparation of rail ends before welding
- Performing rail welding
- Completion of the weld
- Specific technical requirements
- Penetration testing
- Inspection criteria

### Track merge welding
- Determine the position of the weld
- Reminder of specific measures

### Maintenance welding
- Machining of molds
- Supplier warranty

### Welding traceability
- Weld marking (punch number)
- Issuance of the daily report

| Delivery | |
|---|---|
| Duration | 7 hours over 5 days of module 06 |
| Date and deadline | At your request and according to our schedule |
| Place | Raismes |
| Price | Please contact us |

7


# APR Process

Pandrol's APR process sets the world standard for aluminothermic welding of overhead crane rails and delivers excellent results.

It was designed specifically for environments such as ports, docks, mines and warehouses. It is easily adaptable to different industrial sites, offering tailor-made technical features.





## Module 7–APR

### Audience
- This course is intended for aluminothermic welders who wish to specialize in the welding of overhead crane rails

### Prerequisites
- Be an employee of an aluminothermic rail welding company.
- Holder of at least oral and written B1 level in French or equivalent

### Required Qualifications
- Good hand and movement skills. Satisfactory visual acuity is a determining factor for success in this training

### Main Goals
- Apply the basic safety rules related to the aluminothermic welding.
- Choose consumables and equipment adequate to the context of the site.
- Carry out the welding of the rails on the track according to the operating mode and the SNCF prescriptions.
- Check the conformity of the work performed.

### Teaching Methods
- Objective based teaching
- Theory in the classroom (video/tutorial techniques)
- Practical demonstration in the workshop and on the track
- Technical documents given to each participant
- Concrete case studies
- Questions/Answers along with exchanges with the students

### Assessment and validation of acquired knowledge
- Theoretical MCQ
- Practical examination
- End of training diploma

## Course Contents

### Metallurgical Principles
- State the metallurgical principles of rails
- State the principles of aluminothermic welding
- Metallurgical nuances of rails
- Adequacy of aluminothermic charge/rails

### Worksite Safety
- Choosing the right personal protective equipment
- Understanding inherent occupational risks
- Identifying railway risks

### Welding Methods
- Rail profile and grade identification
- Preparation of rail ends before welding
- Performing rail welding
- Completion of the weld

### Track merge welding
- Determine the position of the weld
- Reminder of specific measures

### Maintenance welding
- Machining of molds
- Supplier warranty

### Welding traceability
- Weld marking (punch number)
- Issuance of the daily report

| Delivery | |
|---|---|
| Duration | 5 days (35 hours) Extension |
| Date and deadline | At your request and according to our schedule |
| Place | Raismes |
| Price | Please contact us |

8

# Aluminothermic rail welding inspector

In the railway industry, safety is paramount. Pandrol has a global inspection offer. Our team will advise you on the most appropriate techniques and devices, with theoretical and practical training recognized throughout the industry.





## Module 8–Inspector

**Audience**
- This course is intended for personnel from aluminothermic welding companies wishing to organize welding inspections

**Prerequisites**
- Be an employee of an aluminothermic rail welding company.
- Holder of at least oral and written B1 level in French or equivalent

**Required Qualifications**
- Possess organizational skills
- Be methodical and respectful of the technical documentation

**Main Goals**
- Understand the weld inspection methodology
- Understand the European standards
- Mastering the requirements for track inspections
- Check the conformity of the work performed

**Teaching Methods**
- Objective based teaching
- Theory in the classroom (video/tutorial techniques)
- Practical demonstration in the workshop and on the track
- Technical documents given to each participant
- Concrete case studies
- Questions/Answers along with exchanges with the students

**Assessment and validation of acquired knowledge**
- Theoretical MCQ
- Practical examination
- End of training diploma

## Course Contents

**Metallurgical Principles**
- State the metallurgical principles of rails
- State the principles of aluminothermic welding
- Metallurgical nuances of rails
- Adequacy of aluminothermic charge/rails

**Worksite Safety**
- Choosing the right personal protective equipment
- Understanding inherent occupational risks
- Identifying railway risks

**Welding Methods**
- Choosing the materials for the inspection
- Performing inspections according to the standard
- Identifying and classifying weld defects

**Mastery of technical documentation**
- MT00027
- 14730-2
- 13674-1

| Delivery | |
|---|---|
| Duration | 4 days (31 hours) Initial |
| Date and deadline | At your request and according to our schedule |
| Place | Raismes |
| Price | Please contact us |

# Aluminothermic Welding Product Line

At Pandrol we believe in quality first, a commitment that extends from the products we manufacture to the services we provide. We share our knowledge so that our partners can achieve their goals quickly and efficiently.

We invest as much time in developing our services and relationships as we do in developing new solutions.

## The Team

**3** doctors of mechanical engineering and metallurgy

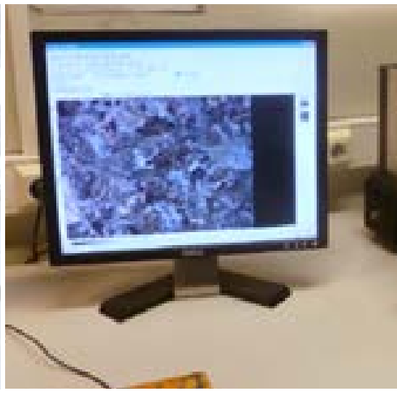
**6** Engineers with expertise in different fields (materials, mechanics etc.)

**4** Technicians
Cofrend II in US / penetration testing and magnetic particle inspection

## Tests that meet current standards

Chemical analyzes with spectrometer

Micrography



Bending machine
(EN, AREMA standards etc.)

Hardness Vickers / Brinell / Rockwell
(2 machines available)

Scanning Electron Microscope with EDS Probe

Non-destructive testing: Penetration Testing, Magnetic Particle Testing, Ultrasound Tests (Array phase)

Fused Zones, Heat Affected Zones, micros, macros

# Mechatronics and IT Department

The mechatronics and IT is a multi-skill department; specialising in mechanics, electronics & IT.

Its role is to design innovative welding tools and make them safer, more reliable, faster and more ergonomic.

## Development Topics

**Our products are developed around 3 topics:**

- Automation of welding tools.
- Connected sensors to transmit data and ensure weld traceability
- Applications to support the welder in his work

Data is at the heart of our solution; each device is designed to communicate so that each step of the weld can be documented automatically.

## HFP

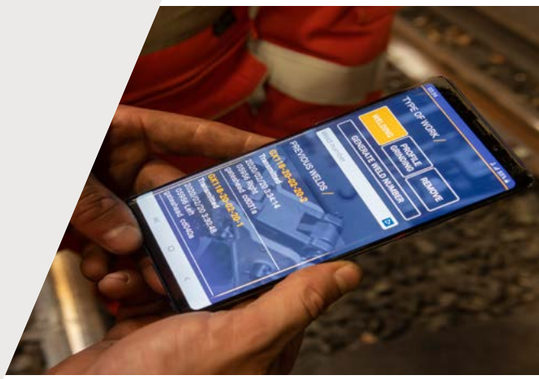
HFP (High Flow Preheater / Universal Preheater) is an automatic preheater. It simplifies operations and guarantees accurate pre-heating.

It was designed to replace all preheating systems and provides the best compromise between each technology.


## Pandrol Connect

Pandrol Connect is a mobile app designed to help welders through the welding process. It records data in real time and makes it available in the cloud.

It saves time with improved welding traceability to help companies and railway network managers.




# IT Deptartment

Our IT Deptartment ensures the development of new products, the management of production and the digital simulation of the aluminothermic welding process.

The digital tools used are equipped with the latest industry 4.0 technologies: PDM, CMMS, laser scanner

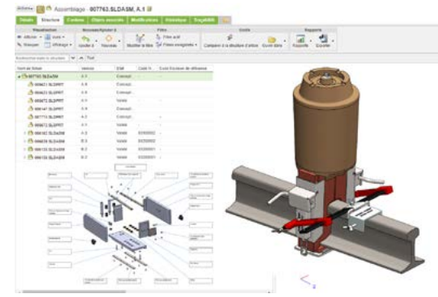
## Equipment

### CMMS Tool

The CMMS tool (Computer-Assisted Maintenance Management) enables real-time management of the entire production fleet used in France and by our subsidiaries.

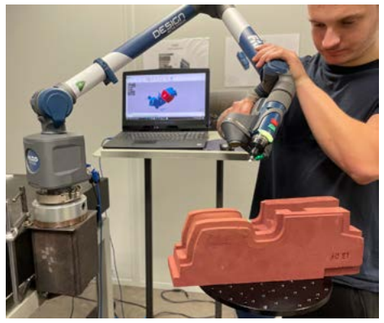
### PDM Tool

The PDM tool (Product Data Management) ensures the traceability of all technical information, from the specifications design to the product marketing, including all stages of development of new products.



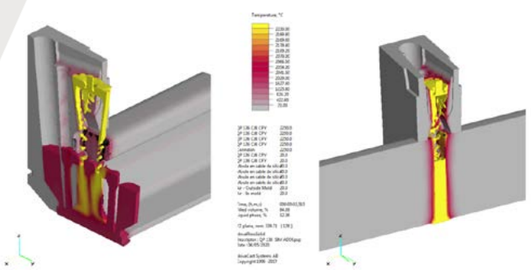
### FARO Arms

The laser scanner is used in the different development phases of new products and also in reverse engineering and geometric inspection.



### Computerized Simulation

The digital modeling tool for aluminothermic welding is an R&D tool that speeds up the development process of new products.



# Track Control Solutions

We put our expertise at your service for the safety of your railway. Railway networks have an increasing need to know the condition of their tracks, which allows them to implement more efficient maintenance operations.

Pandrol Track Control Solutions offers inspection solutions by providing services and/or equipment adapted to all types of networks.

## Our Services

### Ultrasonic Inspection

The inspection is carried out by our level I, II and III certified inspectors in Non Destructive Testing (NDT).

Our technicians are specialized in ultrasonic testing and support maintenance teams by determining the acceptance criteria to be applied to your network beforehand.

An exhaustive report on the quality of the track and the actions to be carried out is provided in order to avoid rail deterioration.

### Track geometry

We measure several parameters such as: alignment, cant, twist, gauge and longitudinal leveling.

Data is collected in a comprehensive report that highlights the detected anomalies and their precise GPS location.

It also takes network data into account (configuration, curves etc.).

The final report will classify all anomalies encountered in order of criticality and provide a schedule of actions to avoid future deterioration.

### Wave wear of the rails

This inspection accurately detects head corrugation wear on both rails of the track.

The objective is to detect areas with corrugated wear and highlight areas that need to be ground to rectify the anomaly.

With eddy current sensors, wave wear is determined with wavelength and amplitude peak values.

### Rail profile

Careful inspection of the rail is achieved using laser technology.

The profile checked is thus compared to the rated profile of the rail.

### Preventive maintenance

All our reports take into account the causes of the damage with proposals for action to avoid further deterioration.

# Track Control Solutions

For over 30 years, Pandrol has been working to make maintenance easier and more reliable.

We work with many railway networks and have helped them with various challenges by providing services or equipment for ultrasonic inspection, track geometry, catenary inspection, gauge, and many others – according to each specific need.

## Our inspection equipment

**Ultrasonic Inspection**

Our product range includes both manual versions for quick inspections, and towed versions which can operate at up to 20km/h for long distance inspection.

We offer reliable equipment to detect defects internal to the rail and to the track in general, because our equipment is also compatible for the inspection of welds, bonded insulating joints, track switches, and any other element of the railway.

**Track geometry**

We offer a range of possibilities for geometry inspection with lightweight, easy-to-use rulers and carriages.

**Catenary inspection**

We offer a variety of equipment for catenary control with light and easy to use rulers – placed on the track in less than 5 minutes with laser technology.

**Gauge control**

We offer rulers and our RouteScan for track gauge inspection.

## Our team

The services are carried out by our team of technicians and experts with level I, II and III certification in Non Destructive Testing (NDT), with more than 30 years of experience in NDT, particularly in Ultrasonic testing.

Our experts, engineers and technicians work with the largest railway networks and maintenance companies around the world.

We help our customers by providing them with complete equipment, adapted to their standards and specifications or by providing services as partners.

We determine along with them the acceptance criteria most suited to meet their needs, solve problems and check the behavior of their network.

**We cover all types of inspection on railway infrastructure.**

Focused on track safety, we are the partner of choice for your maintenance operations.


# Pandrol Railweld

Founded in 1950 (SOTIF), Pandrol Railweld is the works subsidiary of Pandrol, specializing in aluminothermic welding work.

With expertise and unique know-how, Pandrol Railweld welds all types of profile and rail, from overhead cranes to regional DC rails, with all the processes developed and sold by Pandrol.





## Products and Services

Pandrol Railweld is a member of the Union of Railway Works Companies (SETVF–Syndicat des Entreprises de Travaux de Voies Ferroviaires)

All our welders are SNCF and RATP approved and are trained in the different types of welding processes

- PLR (SNCF-RATP RER): standard process, used for Vignole rails (mainly propane induced air preheating)
- PLI (Subway): process that succeeded the BOUTET and DELACHAUX processes and prior to the PLR, for welding Subway profiles (Runway, BG)
- PLA (RATP RER): Vignoles rails, Oxy-Propane preheating, in France from rail grade R350 LHT (air/petrol or air propane preheating, Oxy-Acetylene)
- PLP (SNCF): Vignole rails / LGV en 60 E1 switch rails
- PLM (RATP Subway): Electric current bars
- SRG – SRGN (Tramway): Grooved rails, SRG-N simplified implementation
- AP D/B (SNCF-Port-Industry): Vignole rails, grooved rails, double-headed rails
- APM (VAL Subway): Track
- APR (Port-Industry): Gantry cranes


## Main References

THE OPINION OF OUR CUSTOMERS IS OF THE ESSENCE. Our customers are our ambassadors and trust us

Our teams work on all types of construction sites, all over the world, directly or as subcontractors to railway companies

Classic Network, LGV North – East – Mediterranean, RER C & E

LGV PPP Network: BPL (EIFFAGE)–SEA (VINCI)

RER A & B, Subway

Tramway: Amsterdam, Dijon, Orléans, Brest, Lyon, Roissy CDG, Montpellier, Reims, Bordeaux, Marseille, Valenciennes, Le Havre, Toulouse, Besançon, Dubai, Rhine Bridge (Strasbourg), Luxembourg, Quatar Lusail, Paris T9

Subway: Lille, Turin, Toulouse, Rennes, Roissy CDG, Dubai, Paris Line 14 South and North, Line 11, Line 6.

In France: SNCF, RATP, COLAS Rail, ETF, EIFFAGE Rail, TSO, VOSSLOH, ASCI, ALSTOM, ARCELOR MITTAL, EGENIE, ENDEL, ESAF, EUROTUNNEL, FRA, LSF, MAIA Rail, SOMARAIL, SPIE, TISSEO, TRANSALP, TRANSPOLE, AQUITAINE Rail, DELCOURT Rail, EGENIE, OFFROY, OLICHON, SFERIS, UNIFER, SIEMENS, SOMARAIL, TVF....

Abroad: ALSTOM, DIMASISTO, EFSA, EUROTUNNEL, ETF Luxembourg, GANTREX, HEITKAMP, INFRABEL, Kihn Luxembourg, SEGECO, TNT, VALDITERRA, VIAS, STECONFER


# Track and Welding Equipment

We design and develop equipment to make railway construction and maintenance more efficient.

Our full range of machines and tools ensure safe and efficient implementation of your work, from mounting your rails to grinding your aluminothermic welds.





## Track Equipment

Pandrol develops and manufactures a wide range of equipment for more efficient railway infrastructure construction and maintenance work.

We design, manufacture and market clippers that optimize the assembly and dismantling of rails, and rail/road accessories and adapters for excavators which facilitate the handling of sleepers and rails


## Tools

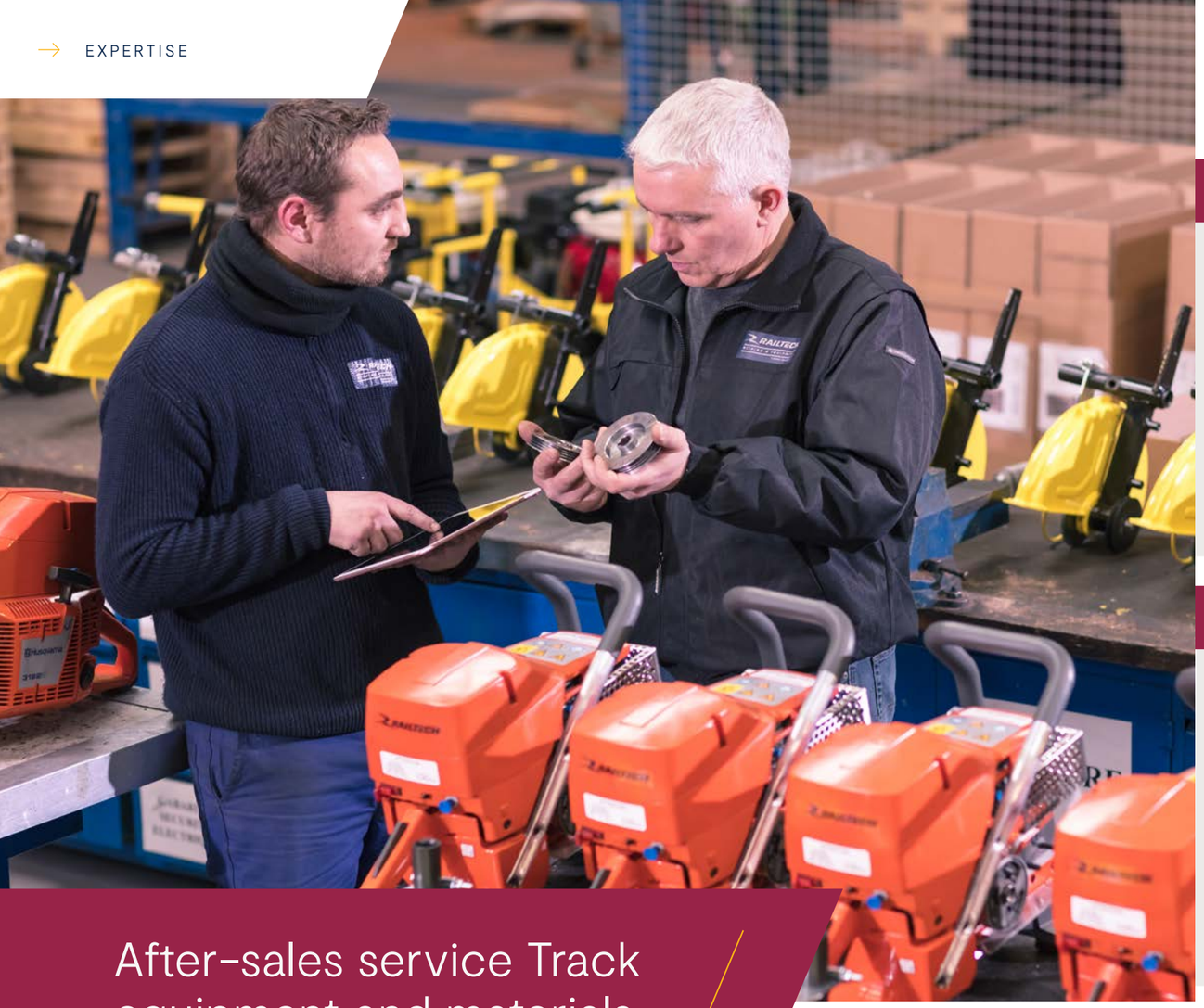
Aluminothermic welding requires that a strict process is followed, each step of which requires compliance with well-defined tolerances. To do this, Pandrol has developed a complete and perfectly adapted set of tools to ensure the success of your welds, from cutting to grinding, including alignment.

Developed and manufactured in our factories around the world, most of our tools are offered with electric or battery power to reduce the impact both on the operator and the environment.

## Safety Equipment

In order to guarantee the safety of our teams in the field, Pandrol offers individual and collective protection solutions, such as safety barriers or protective tents, specific to the welding profession.

These solutions provide a safer and more comfortable working environment, even in difficult weather conditions.



# After-sales service Track equipment and materials

Pandrol after-sales service supports you throughout the life of our products, maximizing their effectiveness and longevity in the field



## Maintenance and repair

The full list of Pandrol work equipment: Grinders, chainsaws, impact wrenches, deburring machines, rulers, clippers, beams, etc.

- Thermal, electric and battery-powered motors;
- Hydraulic sets and systems;
- Mechanically welded parts;

## Advantages of services rendered by the manufacturer

- Maintenance according to SNCF and in compliance with standards.
- Complete verification of machinery: all functionalities are checked and tested.
- Provision of an expertise and repair report.
- Replacement of components with original spare parts.
- Technical expertise as applied to the use of products.

## Our service offer

- Technical assistance on customer site: in France and neighboring countries
- Works in Pandrol workshops
- Supply of original spare parts
- Preventive maintenance: Periodic checks and reviews
- Corrective maintenance: Repair in case of failure
- Retrofit: Modernization and upgrading of your machines
- Calibration with certificate: measurement and adjustment rules, gasbox

**Please contact us**

**Email:** contact.sav@pandrol.com

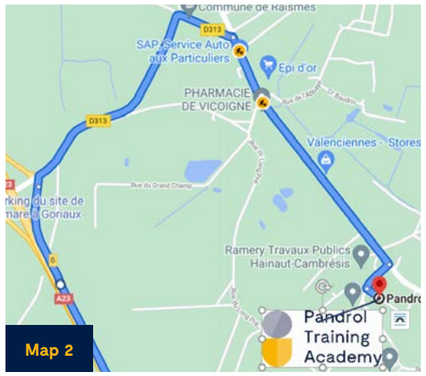
**Direct line:** 06 45 67 97 19

**Address: PANDROL** Equipment and Electrification Unit
Parc Lavoisier, Rue Michel Chasles, Bâtiment T4
59494 Petite Forêt–France

# Useful Information

Access map to the training center


Map 1




Map 2

ZI du Bas Pré
CS 40030

59 590 Raismes–France

Tel: +33 (0)3 27 22 26 26

50.3920119, 3.4692832

## By car

### → From Paris

Take the A1 motorway

Follow A1 and A2/E19 towards D313 at Hauts-de-France.

Continue on A1

Take exit A2/E19 towards Cambrai/ Valenciennes/Bruxelles/Liège

Continue on A2/E19

Take the A23 exit towards Lille/Saint Amand Les Eaux/Anzin/Valenciennes/Saint Waast

Take exit 6 towards Raismes-Vicoigne

At the highway exit, see map 2

### → From Lille

Take the A25 motorway

Take A23, follow Valenciennes/Saint Amand Les Eaux/Centre Routier

Return to A23 towards Tourcoing/Ghent/ Gent/Valenciennes/Brussels/Roubaix

Take exit 6 towards Raismes

At the highway exit, see map 2

### → From Reims

Take the A26/E17 motorway towards Brussels/ Calais/Lille/Laon/Rouen/Reims-Nord A25

Take exit A2/E19 towards Brussels/ Valenciennes/Cambrai

Take the A23 exit towards Lille/Saint Amand Les Eaux/Anzin/Valenciennes/Saint Waast

Take exit 6 towards Raismes

At the highway exit, see map 2

Pandrol Training Academy

PANDROL

DOC/S/RAISMES/FORM/004 version 01

# Registration form

To be returned by e-mail to: valerie.lievin@pandrol.com

## → Company:

Company name: _____

Status (SARL, SA,.. ): _____ SIRET N°: _____ NAF Code: _____

Address: _____

Postal code: _____ City: _____

Tel: _____ company email: _____

Director's name: _____

Administrative contact person for the file: _____ email: _____

## → Training:

| Type of Process | Student's Name & Surname | Date of Birth | Desired date |
|---|---|---|---|
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |

**Registration**: ☐ No meals or accommodation

☐ With meals

☐ With meals & accommodation

## → Billing:

Invoiced to the attention of: _____

Billing address: _____

E-mail of your accounting department: _____

Date: / / Signature – Name of signatory – company stamp

Note: Upon receipt of this registration form, we will get back to you with a quote that meets your expectations.

# Participation Methods

**Do you want more information before registering for a course?**
The courses presented in the brochure give you an overview of the topics covered.
Our advisers, specialists in welding, are at your disposal to develop together with you, the exact training program best addressed to your needs.

**Contact:** Mr Nicolas CHEVALIER, Director
Ms. Valérie LIEVIN, Administrative Manager

## 1. Registration by employer

Registration is done via the registration form or by email

## 2. Prices

The price per type of training is indicated on our educational and financial offer for each course.

All prices are net of taxes, and are added by the current VAT rate.

The prices cover the teaching costs and the documentation provided.

If requested, accommodation and meal costs are added to the educational and financial offer.

## 3. Postponement – Withdrawal – Absence

Any request for student replacement, postponement or cancellation must be confirmed in writing to be effective.

In the event that the beneficiary company waives the execution of this agreement within a period of 5 days before the start date of the training services, subject of this agreement, the beneficiary company undertakes to pay 30% of the agreed training price, net of taxes, as compensation. This sum is not chargeable to the beneficiary company's obligation to participate in continuing professional training, and cannot be the subject of a request for reimbursement or payment by OPCA.

In the event of renunciation by the training organization of the execution of this agreement within a period of 5 days before the start date of the training service, subject of this agreement, PANDROL TRAINING ACADEMY undertakes to pay 30% of the agreed training price, net of taxes, as compensation.

In the event of partial completion of the training, the beneficiary company and PANDROL TRAINING ACADEMY undertake to pay a sum corresponding to 30% of the total amount of the service not performed, net of VAT, as compensation.

In the event of non-completion of the training, pursuant to Article L. 6354-1 of the Labor Code, it is agreed between the signatories of this agreement that in the absence of total or partial performance of the training service, PANDROL TRAINING ACADEMY shall reimburse the co-contracting party for the sums unduly received as a result.

## 4. Invoice – Payment

Our invoices are payable in cash without discount within 30 days of the invoice date. Any unpaid amount on the due date will result in the payment of default interest equal to three times the legal interest rate until the actual payment has been received. If payment is taken over by a collecting organization, the person in charge of registration must communicate to PANDROL TRAINING ACADEMY before the start of the training services, all the indispensable information to ensure payment. If payment is not made, PANDROL TRAINING ACADEMY is entitled to claim the amount payable for the training costs from the registered company, jointly and severally liable.

Our bank account details:

PANDROL SAS, LCL bank account N° RIB 30002/08820/0000060662R / 73

## 5. Legal documents

Upon receipt of the registration form, we will send you the documents for the opening of the course with the cost estimate and the training program.

Upon receipt of the order, we will send you the agreement, the trainee questionnaire, the invitation, the access plan to the site and the list of PPE required to carry out the training.

## 6. Disputes

In the event of a dispute between the parties relating to the application of this agreement, it is agreed that the dispute will be settled amicably by the common search for a solution.

In the event that the parties do not reach an agreement within the month of its anniversary, the dispute will be brought before the competent court.

Jurisdiction is vested in the court of Valenciennes.

## 7. Reception of students

Weekly training schedule:
Mondays, Tuesdays, Wednesdays, Thursdays: 08H00 -12H00 / 13H00 – 17H00
Fridays: 08H00 – 11H00

Daily training schedule: 08H00 -12H00 / 13H00 – 17H00

## 8. Administrative document at the beginning of the course

Rules of procedure: this document is intended to specify certain provisions applying to all participants in the various courses in order to allow regular operation of the courses offered.

## 9. End of training documents

Training evaluation questionnaire: a questionnaire is completed by each student at the end of the course. The participant shares his opinions regarding the progress of the course. This information allows us to make any necessary corrections, and also to constantly enrich our programs, the quality of our instruction and training means.

Sign-up sheet: a follow-up of the attendance of each student is done through this document. It is signed by the student and the instructor. This end-of-training document will be sent to the paying company.

Course documents: Technical notice of the process, Standards in force, Technical prescription of the rail network, Instructions for use of the various materials used

Diploma: If the student has passed the practical and theoretical exams, a diploma will be given to him before his departure.

## 10. After the training

We will send you the invoice, including:

The attendance sheet

The training evaluation questionnaire

The diploma

Pandrol
Training
Academy

## Dedicated to your success

For additional information please call 07 60 41 88 72

www.pandrol.com



PANDROL